



## SEQUENCE LISTING

RECEIVED

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TECH CENTER 1600 2900

\*110> Ayyavoo, Velpandi  
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Weiner, David B.  
Mahalingam, Sundaramy

\*120> Functional Fragments of HIV-1 VPR Protein and Methods  
of Using the Same

\*130> UPN-4023

\*140> 09/415,421

\*141> 2000-10-05

\*150> 60/015,754

\*151> 1997-01-14

\*160> 18

\*170> PatentIn Ver. 2.1

\*210> 1

\*211> 96

\*212> PRT

\*213> Artificial Sequence

\*220>

\*223> Description of Artificial Sequence: Novel Sequence

\*400> 1

Met Glu Glu Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Tyr Pro Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln Gln Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

\*210> 2

\*211> 191

\*212> PRT

\*213> Artificial Sequence

(220)

(223) Description of Artificial Sequence: Novel Sequence

(400) 2

Met	Glu	Glu	Arg	Pro	Pro	Glu	Asn	Glu	Gly	Pro	Gln	Arg	Glu	Pro	Trp	
1				5					10					15		
Asp	Glu	Trp	Val	Val	Glu	Val	Leu	Glu	Glu	Leu	Lys	Glu	Glu	Ala	Leu	
			20					25						30		
Lys	His	Phe	Asp	Pro	Arg	Leu	Leu	Thr	Ala	Leu	Gly	Asn	His	Ile	Tyr	
		35					40					45				
Asn	Arg	His	Gly	Asp	Thr	Leu	Glu	Gly	Ala	Gly	Glu	Leu	Ile	Arg	Ile	
		50				55					60					
Leu	Gln	Arg	Ala	Leu	Phe	Met	His	Phe	Arg	Gly	Gly	Cys	Ile	His	Ser	
	65				70					75					80	
Arg	Ile	Gly	Gln	Pro	Gly	Gly	Gly	Asn	Pro	Leu	Ser	Ala	Ile	Pro	Pro	
				85					90						95	
Ser	Arg	Ser	Met	Leu												
			100													

(210) 3

(211) 111

(212) FRT

(213) Artificial Sequence

(220)

(223) Description of Artificial Sequence: Novel Sequence

(400) 3

Met	Thr	Asn	Pro	Arg	Glu	Thr	Ile	Pro	Pro	Gly	Asn	Ser	Gly	Glu	Glu	
1				5						10				15		
Thr	Ile	Glu	Glu	Ala	Phe	Asp	Trp	Leu	Asp	Arg	Thr	Val	Glu	Ala	Ile	
			20					25					30			
Asn	Arg	Glu	Ala	Val	Asn	His	Leu	Pro	Arg	Glu	Leu	Ile	Phe	Gln	Val	
		35					40					45				
Trp	Gln	Arg	Ser	Trp	Arg	Tyr	Trp	His	Asp	Glu	Gln	Gly	Met	Ser	Arg	
	50					55					60					
Ser	Tyr	Thr	Lys	Tyr	Arg	Tyr	Leu	Cys	Leu	Met	Gln	Lys	Ala	Val	Phe	
	65				70					75					80	
Met	His	Phe	Lys	Lys	Gly	Cys	Thr	Cys	Arg	Gly	Glu	Gly	His	Gly	Pro	
			85						90					95		
Gly	Gly	Trp	Arg	Ser	Gly	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Gly	Leu		
			100					105						110		

<210> 4  
<211> 90  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Novel Sequence

<400> 4  
Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15  
Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30  
His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45  
Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60  
Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80  
Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

<210> 5  
<211> 90  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Novel Sequence

<400> 5  
Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15  
Asp Trp Thr Leu Pro Leu Leu Pro Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30  
His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45  
Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60  
Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80  
Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

<210> 6

42111-96  
42112- PRT  
42113- Artificial Sequence

42200-  
42213- Description of Artificial Sequence: Novel Sequence

44000-6  
Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15  
Asp Trp Thr Ala Glu Ala Ala Glu Glu Ala Lys Asn Glu Ala Val Arg  
20 25 30  
His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45  
Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60  
Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80  
Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

42100-7  
42111-96  
42112- PRT  
42113- Artificial Sequence

42200-  
42213- Description of Artificial Sequence: Novel Sequence

44000-7  
Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15  
Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ser Val Arg  
20 25 30  
His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45  
Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60  
Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80  
Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

42100-8  
42111-96

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 8

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Leu Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

<210> 9

<211> 96

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 9

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Pro Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

<210> 10

<211> 96

<212> PRT

0213: Artificial Sequence

0220:

0223: Description of Artificial Sequence: Novel Sequence

0400: 10

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ser Leu  
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

0210: 11

0211: 96

0212: PPT

0213: Artificial Sequence

0220:

0223: Description of Artificial Sequence: Novel Sequence

0400: 11

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Ser Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

0210: 12

0211: 96

0212: PPT

0213: Artificial Sequence

<200>

<223> Description of Artificial Sequence: Novel Sequence

<400> 12

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Ser Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

<210> 13

<211> 96

<212> PRT

<213> Artificial Sequence

<200>

<223> Description of Artificial Sequence: Novel Sequence

<400> 13

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile Cys Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

<210> 14

<211> 96

<212> PRT

<213> Artificial Sequence

42200

42230 Description of Artificial Sequence: Novel Sequence

44000 14

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile Tyr Phe Arg Ile Gly Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

42100 15

42110 96

42120 PRT

42130 Artificial Sequence

42200

42230 Description of Artificial Sequence: Novel Sequence

44000 15

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Ala Cys Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

42100 16

42110 96

42120 PRT

42130 Artificial Sequence

42200



4223: Description of Artificial Sequence: Novel Sequence

4400: 16

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Ser Arg His Ser Arg  
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser  
85 90 95

4210: 17

4211: 78

4212: PRT

4213: Artificial Sequence

4220:

4223: Description of Artificial Sequence: Novel Sequence

4400: 17

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn  
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg  
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu  
35 40 45

Thr Tyr Gly Asp Ile Trp Ile Gly Val Glu Ala Leu Ile Arg Ile Leu  
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Gln Asn Trp Val Ser Thr  
65 70 75

4210: 19

4211: 96

4212: PRT

4213: Artificial Sequence

4230:

4223: Description of Artificial Sequence: Novel Sequence

4400: 18

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Tyr Pro Asn

1	5	10	15
Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg	20	25	30
His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu	35	40	45
Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu	50	55	60
Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg	65	70	75
Ile Gly Ile Ile Gln Gln Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser	85	90	95